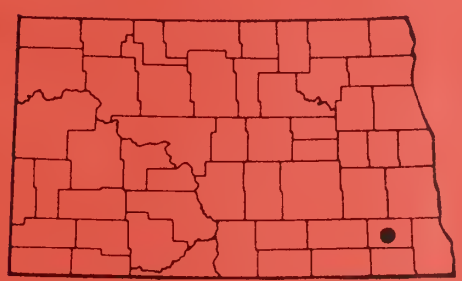
# FLOOD HAZARD ANALYSES

# THE CITY OF LISBON

## RANSOM COUNTY,

## NORTH DAKOTA

NORTH DAKOTA



Prepared by
UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Bismarck, North Dakota

In cooperation with the
CITY OF LISBON
and the
NORTH DAKOTA STATE WATER COMMISSION

JULY 1974

SOIL CONSERVATION SERVICE

USDA-SCS-LINCOLN, NEBR. 1974

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# CITY OF LISBON

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United States Department of Agriculture
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North Dakota State Water Commission

July 1974

# LISBON FLOOD HAZARD ANALYSES

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## FOREWORD

This Flood Hazard Analyses Report delineates areas subject to flooding by the Sheyenne River within the city of Lisbon, North Dakota.

This cooperative study was requested by the city of Lisbon through the North Dakota State Water Commission, in accordance with the Commission's October 1972 Joint Coordination Agreement with the Soil Conservation Service.

The study was carried out according to the Plan of Study developed by the State Water Commission, the city, the Ransom County Soil Conservation District, and the Soil Conservation Service.

This report is to serve as a technical tool to aid in regulating the land use and development of flood-prone areas within the corporate limit and as a guide for future development.

The Soil Conservation Service and the North Dakota State Water Commission will provide interpretation and technical assistance in the application of the flood hazard data presented in this report.

# INTRODUCTION

The purpose of this technical study is to identify flood hazards within the city of Lisbon, for use in implementing a local flood plain management program and assuring proper land use.

This flood hazard study was requested by the city of Lisbon through the North Dakota State Water Commission, under the Joint Coordination Agreement signed with the Soil Conservation Service, U. S. Department of Agriculture, in October, 1972. The Soil Conservation Service carries out flood hazard studies under the authority of Section 6 of Public Law 83-566, in response to Recommendation 9(c), "Regulation of Land Use," of House Document No. 465, 89th Congress, 2nd Session, and in compliance with Executive Order 11296, dated August 10, 1966. Priorities regarding such studies are set by the North Dakota State Water Commission.

Potential users of flood plains should base planning decisions upon the advantages and disadvantages of each location. Knowledge of flood hazards is not widespread and consequently the managers, potential users, and occupants cannot always accurately assess the risks. In order for flood plain management to effectively play its role in the planning, development, and use of flood plains, it is necessary to:

1. Assist State and local units of government in preparing appropriate technical information and interpretations for use in flood plain management.

2. Provide technical services to managers of flood plain property for community, industrial, and agricultural uses.

3. Improve basic technical knowledge about flood hazards in cooperation with other agencies and groups.

This report contains aerial photomosaic maps, high water profiles, and typical valley cross sections indicating the extent of flooding which can occur from the Sheyenne River. Three separate floods are outlined, the 50-,100-, and 500-year frequency events.

This report also contains recommendations for the solution of local flood problems, such as installing dikes and levees and channel work. This report is intended to provide a technical basis for minimizing future flood damages through a local flood plain management program.

The North Dakota State Water Commission and the Soil Conservation Service will, upon request, provide technical assistance to Federal, State, and local agencies and organizations in the interpretation and use of the information developed in this study.

## DESCRIPTION OF THE STUDY AREA

### Study Area

The area studied is within the corporate limits of the city of Lisbon, North Dakota, within the jurisdictional limits of the City for the application of zoning and subdivision regulations containing flood plain management provisions.

The limits of the study area are shown on the index map. (Plate 4).

## The Community

Lisbon, present population of nearly 2,100, is predominantly a farm community. Most of the people are employed directly with agriculture and agricultural-related enterprises.

Clark Equipment Company (Melroe Division), a large manufacturing concern, is located in Gwinner, North Dakota, about 15 miles south of Lisbon. Due to the small size of Gwinner, a large portion of the employees prefer to live in Lisbon because of the school system, shopping facilities, golf course, and other community advantages.

The present area of incorporation is approximately two and one-quarter square miles. The present platted area is about 1,200 acres. The remaining unplatted area is being used for agricultural purposes.

The community is currently experiencing a significant increase in housing construction as a result of the expansion of the Melroe Division of Clark Equipment Company at Gwinner.

## Watershed and Stream Characteristics

The Sheyenne River has a total drainage area of approximately 8,190 square miles above Lisbon, of which some 5,700 square miles are noncontributing. The noncontributing area includes an estimated 3,800 square miles in closed basins.

The Sheyenne River originates in Sheridan County and flows eastward

across the northern half of Eddy County, then southward to Ransom County where it curves northeastward and joins the Red River of the North north of Fargo.

A small city dam is located within the corporate limit of Lisbon, at River Mile 162.1. This dam was originally built in 1882 as a combination dam for water power to operate a mill and for water supply for the railroad.

The first repair of the dam was made in 1942, and repaired again in 1955. In 1966-67 the dam was remodeled and presently serves as a scenic area for the park, recharging the city water supply, and water supply for irrigating the golf course. The capacity of storage is approximately 110 acre feet.

During a 100-year frequency flood the effect from the dam would raise the water surface 0.5 feet. (See Plate 1 - Flood Profile).

The soils in the watershed have developed on undulating to rolling and hilly glacial drift, and on level former glacial lake and outwash plains. The soils include sandy loams, loams, and clay loams. Most of the area is cultivated.

Practically the entire drainage area is mantled with the glacial drift. The uplands are covered with till and associated glaciofluvial deposits, but bedrock of Late Cretaceous Age are exposed in the valleys of the Sheyenne River. The Sheyenne River has eroded more than 150 feet below the adjacent

plains and has exposed the Pierre Formation from Valley City southward to the Niobrara contact near the Ransom County line. The Niobrara shale is exposed in road cuts in the valley walls from the county line to the city of Lisbon.

The Sheyenne River flows in a valley formed by a glacial meltwater channel 100 to 200 feet deep and one-fourth to one mile wide. Alluvium has been deposited in the Sheyenne valley as a valley fill and subsequently dissected by the river. Consequently, the only landforms associated with the alluvial deposits are poorly developed terraces approximately 10 feet above the present level of the Sheyenne River.

## Climate

The climate of Lisbon is typical of the Great Plains with warm summers and cold winters. The frequent passage of weather systems across the area brings a wide variety of weather in all seasons and wide variations in temperature from day to day and month to month. Summers are warm and pleasant with sunny days and cool nights. Maximum temperatures during the three summer months average 81 degrees. Temperatures of 90 degrees or more occur on an average of 20 days per year ranging from 4 in the coolest summers to 41 in 1936. Temperatures during the winter months of December, January, and February average about 11.8 degrees, but maximum temperatures exceed 32 degrees on 23 days during these months. During outbreaks of cold from artic air, temperatures drop to zero or below on an average of 49 days each year.

The annual precipitation at Lisbon is 20.3 inches, of which about 80 percent falls in the growing season, April through September; about 47 percent falls in the months of May, June, and July. Annual precipitation has ranged from over 30 inches in 1941 and 1962 to about 9 inches in 1936. Summertime precipitation is usually in the form of thunderstorms; about 30 storms are reported each year with normally 7 in each of the months of June, July, and August. June is usually the wettest month of the year but July 1962, when 10.4 inches of precipitation were measured, is the wettest month on record. Precipitation of .10 inch or more per day can be expected on an average of 39 days per year and rainfall of 1.00 inch or more per day occurs two or three times per year. The likelihood of 1.00 inch or more of rain in a 7-day period is greatest the fourth week in June, when the chance is three years in eight. The likelihood of a dry 7-day period, trace or less, is greatest the last week in December, when the chance is once in two years. Precipitation intensities of about 1.20 inches or more in one hour, 1.80 inches in 6 hours, and 2.30 inches in 24 hours can be expected once in two years. Thirty-one inches of total snow fall can be expected each year in Lisbon, but snowfall has varied from 88 inches in 1936-1937 to 10 inches in 1924-1925. The greatest snowfall in one month was 42 inches in February 1915, when 24 inches fell on February 15. Measureable snow can be expected one year in four in October, one year in seven in May, and one year in two in April.

## Historical Floods

Flooding occurs to portions of Lisbon on the average of once every ten years. The large floods occur from spring snowmelt runoff due to

winter accumulations of snow and frozen soil conditions. There is no historical documentation of large floods occurring from excess rainfall.

Floods in recent years occurred in April 1969, April 1950, and April 1947. Floods of earlier years occurred in April 1916, April 1897, and April 1882. During these floods, streets and roads are generally impassable for a period of approximately ten days and some homes are temporarily evacuated. A 100-year frequency flood will inundate 215 homes and 63 places of business.

There are approximately 1,440 acres within the corporate limits. A 50-year frequency flood will inundate approximately 325 acres (22 percent of the city); a 100-year flood will inundate approximately 453 acres (31 percent of the city); and a 500-year flood will inundate approximately 558 acres (39 percent of the city).

## TECHNICAL STUDY PROCEDURES

The USGS streamgage, Sheyenne River at Lisbon (No. 05-058700), with 20 years of record, provided the necessary peak-frequency-stage data. The 100-year frequency flood discharge used is the same as that used by the St. Paul District, U. S. Army Corps of Engineers (18,000 cfs). Water surface profiles for the 50-, 100-, and 500-year frequency floods were based on the Step Method of hydraulics.

The areas subject to inundation by the 50-, 100-, and 500-year frequency floods are shown on August 1968 aerial photomosaics in this report. The water surface elevation lines for the 100-year flood also shown on the photomosaics maps are intended to serve as a guide for city planners

and builders. While most of these elevation lines are at whole foot elevations, any location in between the lines can be interpolated using the water surface profiles.

Elevation-Frequency Curve

An elevation-frequency curve (Figure 3) was developed for the river at the Burlington Northern Railroad crossing. This curve is typical of the entire reach within the corporate limit.

## FLOOD PLAIN MANAGEMENT

With technical flood hazard information available, the City has a valuable tool to minimize future flood losses by planning for the protection, wise use and orderly development of its flood plains. The overall plans of the community for industrial, commercial, and residential areas, for streets, utilities, parks, and schools, can be coordinated with the need to temporarily store and convey floodwaters.

A planning procedure such as this is an integral part of a comprehensive flood plain management program. Effective flood plain management involves the full range of public policy and action for obtaining wise use of the flood plains. It includes a range of measures from collection and dissemination of flood control information to acquistion of flood plain lands, construction of control measures, and enactment and administration of codes, ordinances, and statutes regarding flood plain land use and development.

A sound local flood plain management program is comprised of numerous

elements (See Figure 1 and Figure 2). Some of these are: structural flood control works to protect existing development; regulations to guide new development; flood insurance to protect existing and new buildings; and individual protection measures, including flood proofing.

Recommendations

Some specific recommendations for alleviating the flood situation in Lisbon are:

1. Adoption of local land use and zoning regulations for all flood plain areas.
2. Installation of a levee system for those flood plain areas extensively developed, especially residential and public buildings.
3. Flood proofing of all existing or future buildings that otherwise cannot be adequately protected. (See U. S. Army Corps of Engineers Manual on Flood Proofing Regulations, EP 11652314.)
4. The City should apply to the Federal Insurance Administration, HUD, to participate in the National Flood Insurance Program, so that flood insurance can be made available to all buildings and mobile homes in the community.
5. A flood warning system should be installed to warn the community of impending flood stages of critical height. The community should apply to NOAA for installation of such a system.
6. Using as much as possible of the flood hazard area for the city parks and other open space uses.

## Flood Control Measures

Various flood control measures including floodwater retarding structures, levees, floodways and channel work, or a combination of these should be installed to reduce flood damages to existing and future developments.

## Flood Plain Regulations

Flood plain regulations are designed to permit realistic use of flood plain areas without materially increasing the flood damage potential. Among the various elements used to accomplish this are zoning ordinances, subdivision regulations, building codes, and sanitary and utility reguations.

Flood plain management practices are necessary tools to protect human life and health and minimize property damages and economic losses to the community. Local units of government should adopt flood plain regulations as soon as sufficient data are available to determine the floodway areas required along the river and side tributaries.

The basic purpose of flood plain regulations is to regulate development on the flood plain consistent with nature's needs for the conveyance of flood flows and the community's land use and development objectives.

## Flood Insurance

Under the National Flood Insurance Act of 1968, the Department of Housing and Urban Development (HUD) is authorized to carry out a National Flood Insurance Program which makes flood insurance coverage available to

all buildings and mobile homes in the community. Coverage is available for all structures used for residential, business, religious and agricultural purposes, buildings occupied by nonprofit organizations, and those owned by State or local governments or their agencies. Coverage is also available for the contents of these buildings.

Flood insurance can be purchased by individual property owners or occupiers only after the community applies to HUD and warrants it has adopted the necessary land use and control measures, including building permits, for flood hazard areas consistent with criteria set forth in HUD regulations.

Further inquiries about the flood insurance program should be directed to the North Dakota State Water Commission, the official State coordinating agency for flood insurance.

Other Measures

Land use and other regulatory controls including zoning, subdivision regulations and building codes play an important role in flood plain management. However, in order for these measures to be effective, it is important that the community take action to implement other programs and measures to supplement these controls. A few possible measures are (1) open space land acquistion programs, (2) urban renewal programs, (3) preferential tax assessment, (4) flood proofing of existing structures, and (5) public policy governing the construction of utilities and public facilities such as bridges and streets compatible with the flood potential

and to locate such facilities in a manner to control development in flood-prone areas.

The North Dakota State Water Commission, upon request, will provide assistance to the community in such areas as flood proofing techniques, the implementation of a flood warning system and establishment of a local flood data collection program.

TABLE 1

ESTIMATED ELEVATION-FREQUENCY DATA

FOR SHEYENNE RIVER

AT LISBON, NORTH DAKOTA

| Location | Sheyenne River - Existing Condition | | |
|---|---|---|---|
| | 500-Year Frequency Flood | 100-Year Frequency Flood | 50-Year Frequency Flood |
| | Elevation (msl) | Elevation (msl) | Elevation (msl) |
| North corporate limit-Sec. 2, T 134N, R 56W (River mile 163.12) 1/ | 1095.0 | 1092.1 | 1091.0 |
| Burlington Northern Railroad bridge(River mile 161.30) 1/ | 1091.5 | 1089.2 | 1087.4 |
| South corporate limit-Sec. 11, T 134N, R 56W (River mile 160.60) 1/ | 1090.6 | 1088.8 | 1087.0 |

1/ River mile 0.00 is at the confluence of the Sheyenne River with the Red River of the North.

USDA - SCS
July, 1974

TABLE 2

RECENT HISTORIC FLOODS OBSERVED

ON THE

SHEYENNE RIVER AT

LISBON, NORTH DAKOTA

(USGS Streamgage No. 05-058700) 1/

| Year | Month | Estimated Peak Discharge (cfs) |
|---|---|---|
| 1969 | April | 4380 |
| 1966 | March | 4260 |
| 1965 | April | 3630 |
| 1962 | April | 2210 |
| *1947 | April | 5800 |

1/ Drainage area, as published by the U. S. Geological Survey, is 8,190 square miles. (Includes 3,800 square miles in closed basins.)

* Estimated to be a 20-year frequency flood.

USDA - SCS
July, 1974

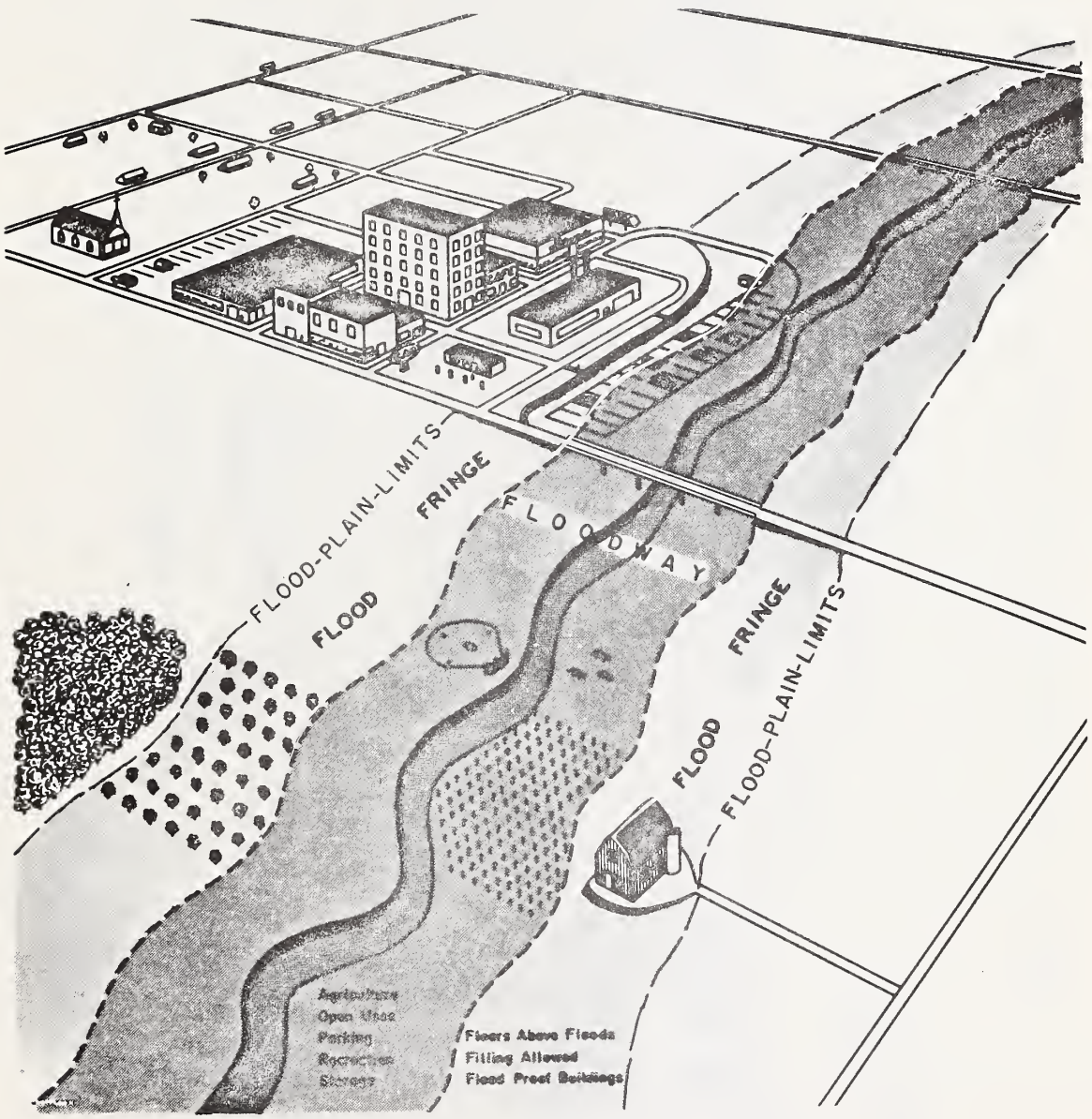



Figure 1. Perspective view of a typical regulatory flood plain

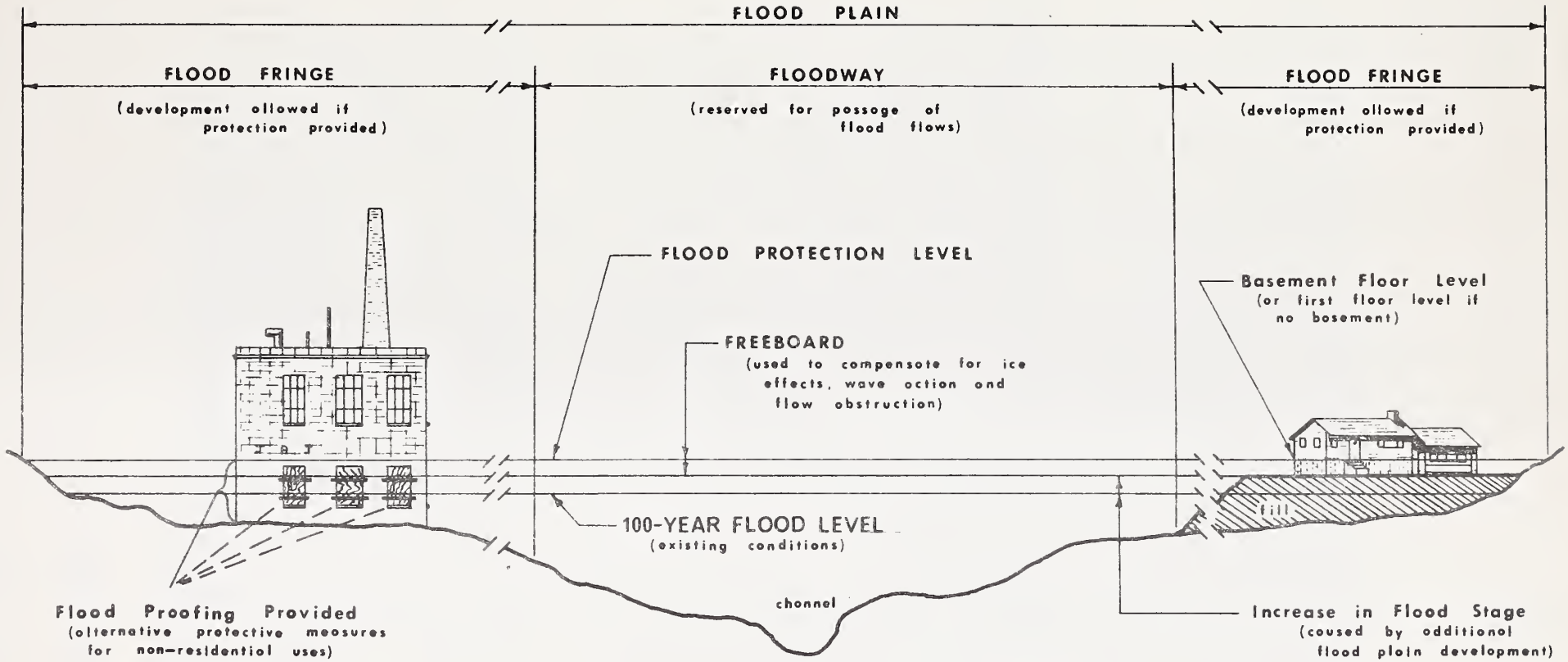
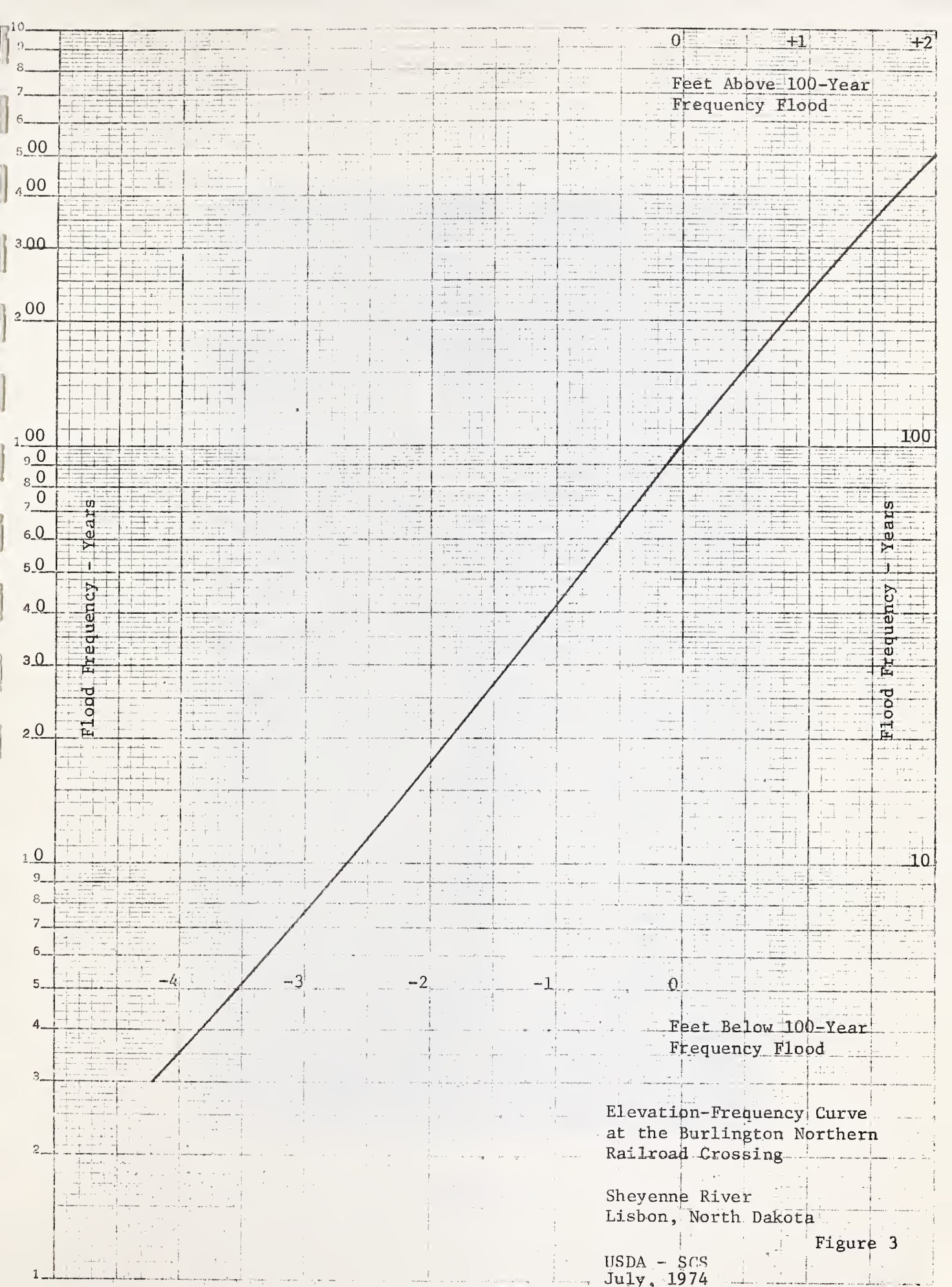



Figure 2. Cross sectional view of a typical regulatory flood plain




Elevation-Frequency Curve
at the Burlington Northern
Railroad Crossing

Sheyenne River
Lisbon, North Dakota

Figure 3

USDA - SCS
July, 1974

FLOOD SCENE - OAK STREET, ONE BLOCK NORTH OF LISBON HOTEL - APRIL 1947.

FIGURE 4

FLOOD SCENE - ONE BLOCK WEST OF MAIN STREET ON THIRD STREET - APRIL 1947.

FIGURE 5

USDA-SCS-LINCOLN, NEBR. 1974

5,0-32,956.2

FIGURE 6

FLOOD SCENE - SECOND AVENUE WEST, ONE BLOCK WEST OF MAIN STREET - APRIL 1947.

FIGURE 7

FLOOD SCENE - OAK STREET AND SECOND AVENUE, APRIL 1947.

USDA-SCS-LINCOLN, NEBR. 1974

5,0-32,956.3

FIGURE 8

FLOOD SCENE - OAK AND SECOND AVENUE - APRIL 1947.

FIGURE 9

FLOOD SCENE - OAK STREET AND SECOND AVENUE, ONE BLOCK WEST OF MAIN STREET - APRIL 1947.

USDA-SCS LINCOLN, NEBR. 1974

5,0-32,956.4


FIGURE 10

FLOOD STAGES AT SIXTH AVENUE AND HARRIS STREET.


FIGURE 11

FLOOD STAGES AT FOREST STREET AND FIRST AVENUE WEST.
(LISBON PARK IN BACKGROUND)

USDA-SCS-LINCOLN, NEBR. 1974

5,0-32,956.5


FIGURE 12

FLOOD STAGE AT ELM STREET AND SECOND AVENUE WEST.


FIGURE 13

FLOOD STAGES AT OAK STREET AND THIRD AVENUE WEST.

USDA-SCS LINCOLN, NEBR. 1974

5,0-32,956.6


FIGURE 14

FLOOD STAGES AT THE RED OWL STORE ON MAIN STREET.

FIGURE 15


FLOOD STAGES AT THE FARMERS STATE BANK ON MAIN STREET.

5,0-32,956.7


FIGURE 16

FLOOD STAGES AT FIFTH STREET AND THE SHEYENNE RIVER.


FIGURE 17

FLOOD STAGES AT THE ARMSTRONG LOZIER FUNERAL HOME.

USDA-SCS-LINCOLN, NEBR. 1974

5,0-32,956.8


FIGURE 18

FLOOD STAGES AT THE COMMANDANTS RESIDENCE. (NORTH DAKOTA SOLIDERS' HOME)


FIGURE 19

FLOOD STAGES AT THE NORTH DAKOTA SOLDIERS' HOME.

USDA-SCS-LINCOLN, NEBR. 1974

5,0-32,956.9

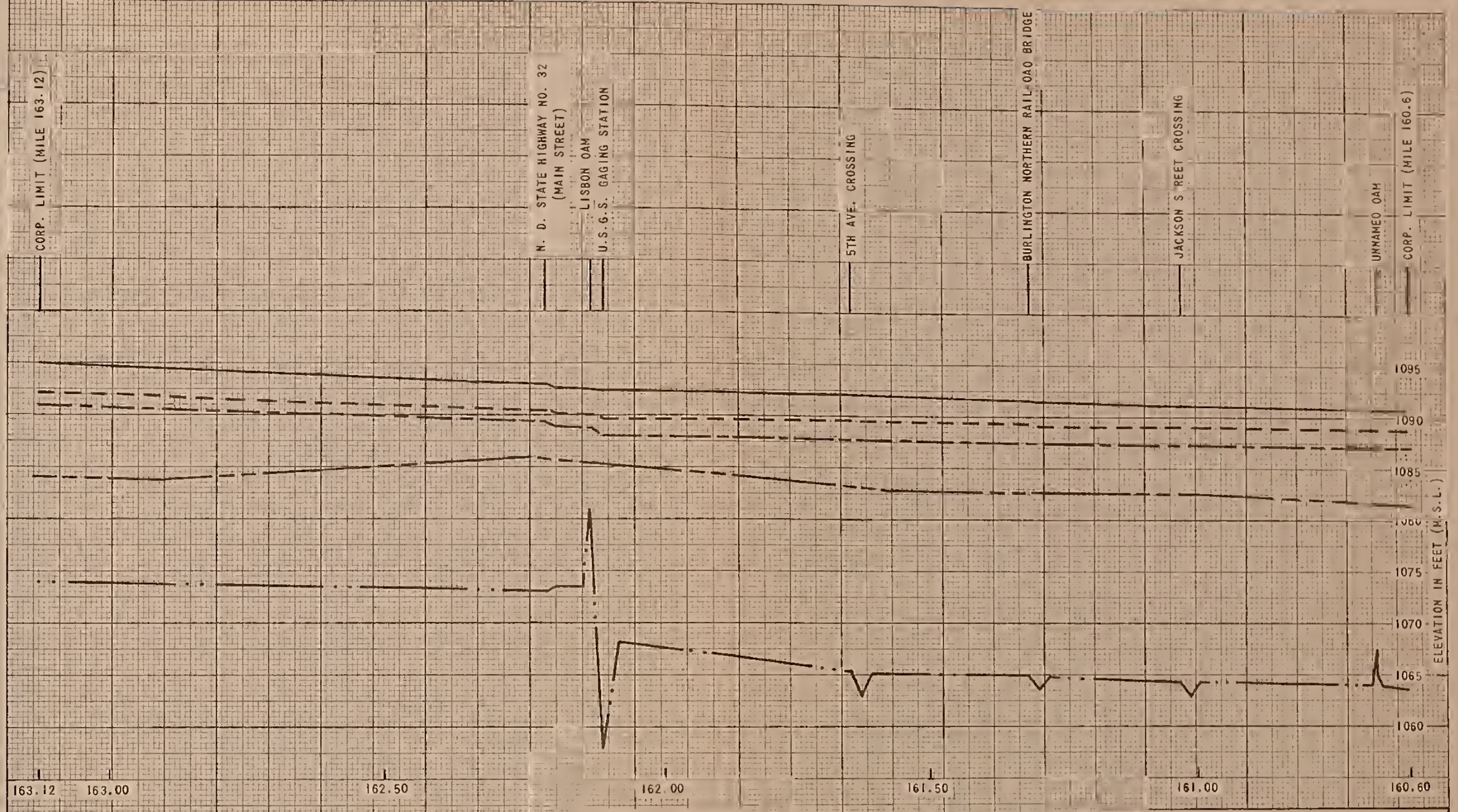

FLOOD STAGES AT VALLEY STREET AND SECOND AVENUE EAST.

FIGURE 20

FIGURE 21


FLOOD STAGES AT THE EAST END OF SECOND AVENUE.

5,0-32,956.10




NOTE: MILE 0.00 IS AT THE CONFLUENCE OF THE SHEYENNE RIVER AND THE RED RIVER OF THE NORTH.

LEGEND

- 500-YEAR FLOOD
- 100-YEAR FLOOD
- 10-YEAR FLOOD
- LOW BANK
- CHANNEL BOTTOM

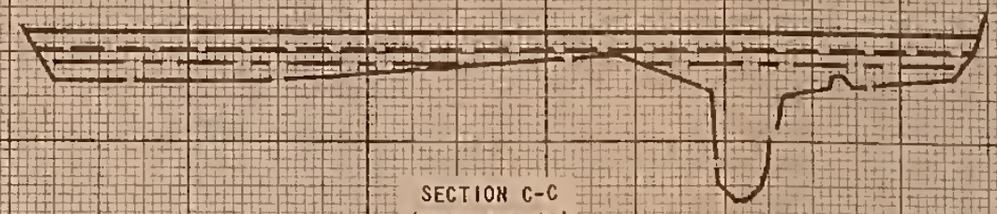
# RIVER PROFILES
# SHEYENNE RIVER
## LISBON, NORTH DAKOTA

**U. S. DEPARTMENT OF AGRICULTURE**
**SOIL CONSERVATION SERVICE**

| | | | |
|---|---|---|---|
| Designed J.H.S. | Date 10-73 | Approved by | |
| Drawn | | Title | |
| Traced | | Title | |
| Checked | | Sheet No. of | Drawing No. 5,0-32,956.11 |

USDA-SCS-LINCOLN NEBR. 1974

PLATE 1




SECTION C-C
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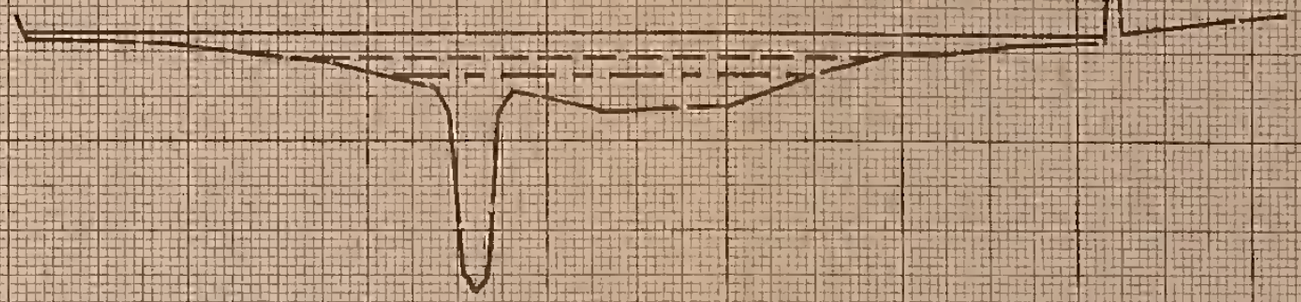
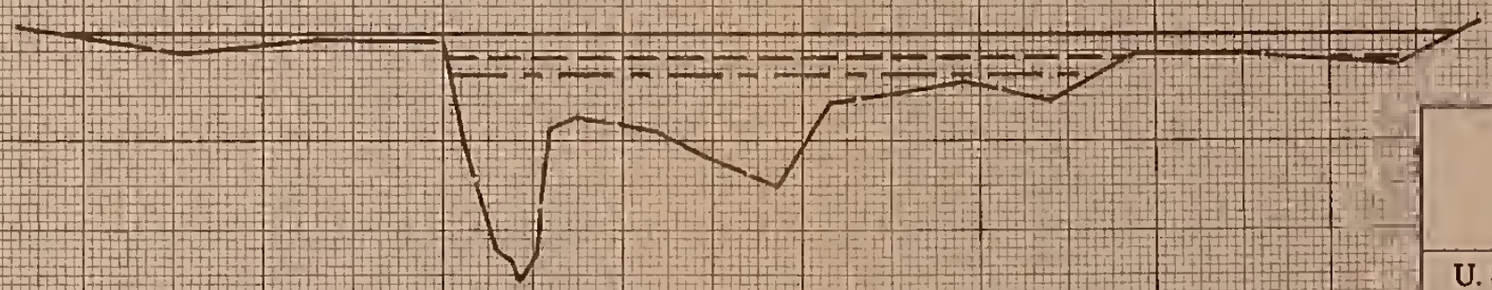



SECTION B-B
(MILE 161.63)




SECTION A-A
(MILE 161.29)

LEGEND

500-YEAR FLOOD

100-YEAR FLOOD

50-YEAR FLOOD

GROUND LINE

200 0 200 400

SCALE IN FEET

CROSS SECTIONS
SHEYENNE RIVER
LISBON, NORTH DAKOTA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

| | | | |
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| Designed J.H.S. | Date 10-73 | Approved by | |
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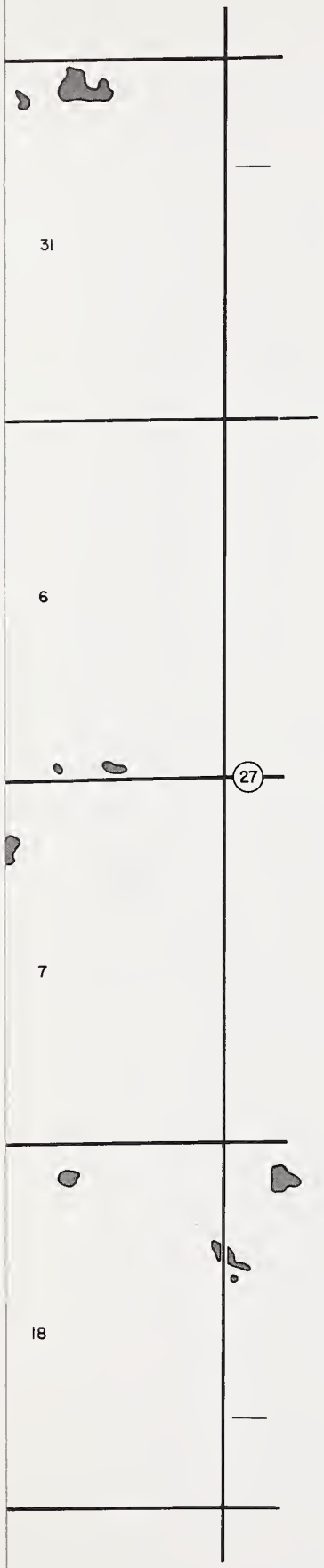
PLATE 2

USDA-SCS-LINCOLN, NEBR. 1974



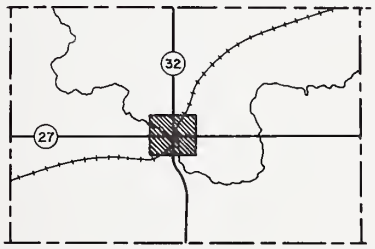

## LEGEND

- ROAD
- RAILROAD
- DRAINAGE
- LAKE
- CORPORATE LIMIT
- G.L.O. TOWNSHIP LINE
- SECTION LINE

SCALE 1/30,000

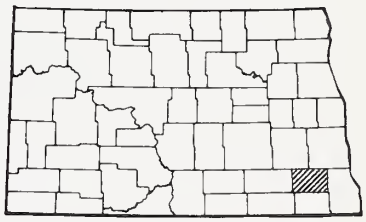
SCALE 0 1/4 1/2 1 MILE

POLYCONIC PROJECTION




LOCATION OF MAP IN RANSOM COUNTY

LOCATION OF RANSOM COUNTY IN NORTH DAKOTA



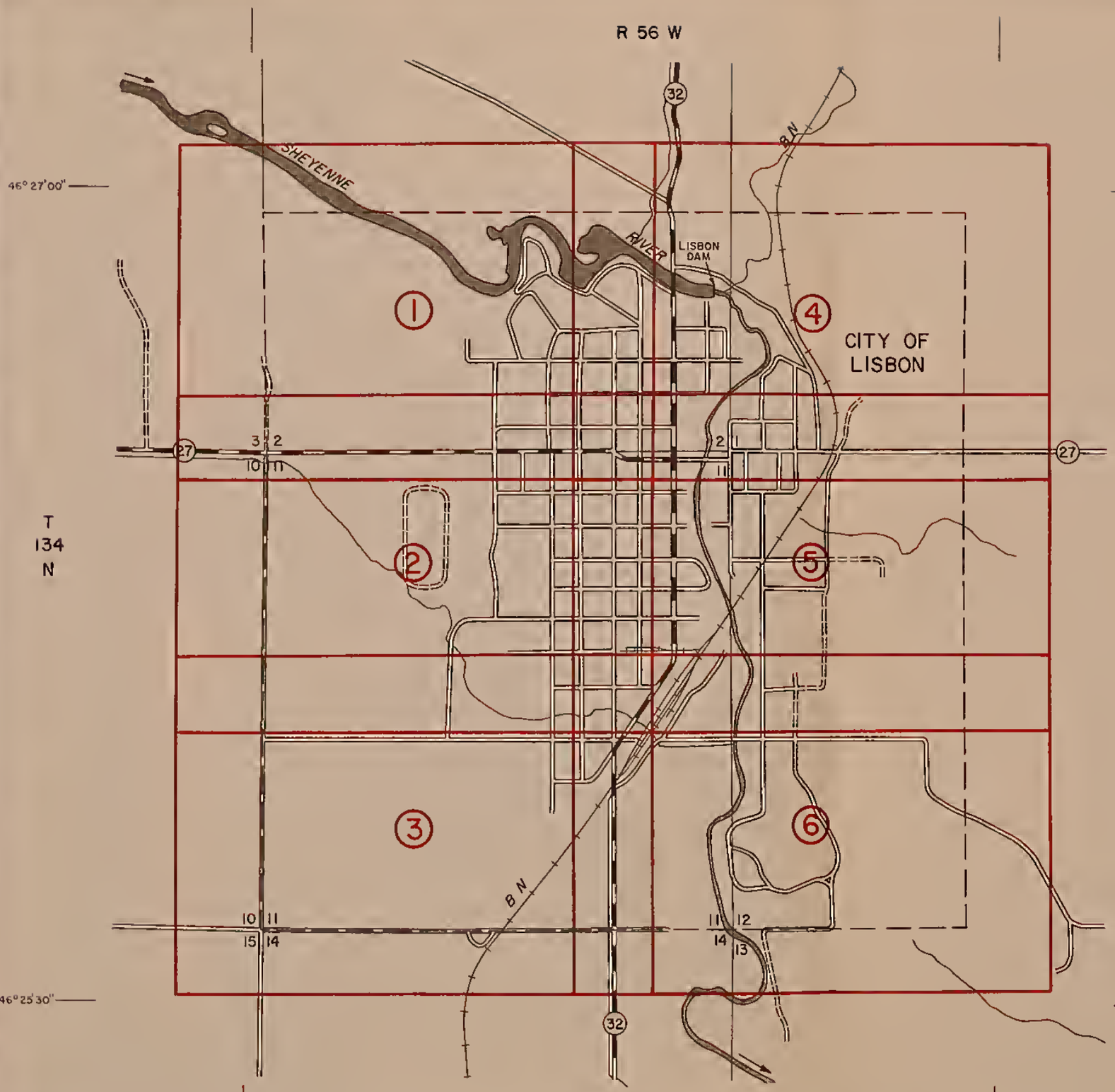
# LOCATION MAP
## THE CITY OF LISBON
## FLOOD HAZARD ANALYSES
### RANSOM CO., NORTH DAKOTA
### PLATE 3

3-5-74

5,0-32,956.13

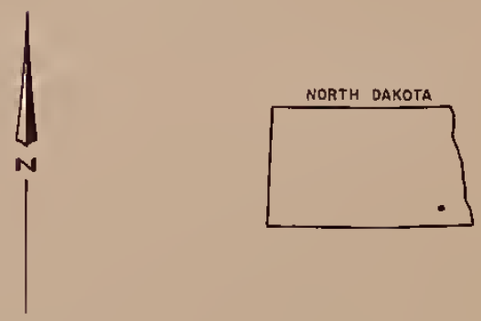
U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE




LEGEND

- ③ SHEET COVERAGE
- STREAM NETWORK
- HARD SURFACE ROAD
- IMPROVED ROAD
- DIRT ROAD
- RAILROAD
- CORPORATE LIMIT




# SHEET INDEX MAP

## LISBON FLOOD HAZARD STUDY AREA
## RANSOM COUNTY, NORTH DAKOTA

PLATE 4

SOURCE:
LISBON S.E. – 1962 U.S.G.S. 7 1/2' QUADRANGLE MAP.

USDA-SCS-LINCOLN, NEBR. 1974

3-5-74

5,0-32,956.14

R 56 W

T 134 N

CORPORATE LIMIT

092.0

CORPORATE LIMIT

RIVER

CITY OF LISBON

105.0

2

LEGEND

500-YEAR FREQUENCY FLOOD

100-YEAR FREQUENCY FLOOD

50-YEAR FREQUENCY FLOOD

STREAM CHANNEL

SEC. E-E VALLEY CROSS SECTION

ESTIMATED 100-YEAR FLOOD ELEVATION

NOTE :
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND.

500-YEAR FREQUENCY FLOOD
100-YEAR FREQUENCY FLOOD
50-YEAR FREQUENCY FLOOD

SCALE 400 0 400 800 1200 FEET
APPROXIMATE

3 2
10 11

SECTION LINE ROAD
STATE HIGHWAY 27

SOURCE : USDA AERIAL PHOTOGRAPHY SERIES CWN-1JJ (AUGUST 1968), AND INFORMATION FROM FIELD TECHNICIANS.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

# LISBON FLOOD HAZARD AREA

RANSOM COUNTY, NORTH DAKOTA

APRIL 1974 SHEET 1 OF 6 PLATE 5

USDA SCS-LINCOLN, NEBR. 1974

5,0-32,956.15

R 56 W

T 134 N

3 | 2
10 | 11

SECTION LINE ROAD
STATE HIGHWAY 27

CORPORATE LIMIT
SECTION LINE

CITY OF LISBON

FOREST STREET

500-YEAR FREQUENCY FLOOD
100-YEAR FREQUENCY FLOOD
50-YEAR FREQUENCY FLOOD

LEGEND

- 500-YEAR FREQUENCY FLOOD
- 100-YEAR FREQUENCY FLOOD
- 50-YEAR FREQUENCY FLOOD
- ESTIMATED 100-YEAR FLOOD ELEVATION

NOTE :
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND.

N

SCALE 400 0 400 800 1200 FEET
APPROXIMATE

SOURCE : USDA AERIAL PHOTOGRAPHY SERIES CWN-1JJ (AUGUST 1968), AND INFORMATION FROM FIELD TECHNICIANS.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

# LISBON FLOOD HAZARD AREA

RANSOM COUNTY, NORTH DAKOTA

APRIL 1974 SHEET 2 OF 6 PLATE 6

USDA-SCS-LINCOLN, NEBR 1974

5.0-32,956.16

R 56 W

T 134 N

CORPORATE LIMIT
SECTION LINE

CITY OF LISBON

500 – YEAR FREQUENCY FLOOD
100 – YEAR FREQUENCY FLOOD

BURLINGTON NORTHERN R.R.

STATE HIGHWAY 32

1088.8

10 | 11
15 | 14

SECTION LINE ROAD
CORPORATE LIMIT

LEGEND

500-YEAR FREQUENCY FLOOD

100-YEAR FREQUENCY FLOOD

ESTIMATED 100-YEAR FLOOD ELEVATION

NOTE :
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND.

NOTE :
NO AREAS ON THIS SHEET ARE SUBJECT TO INUNDATION BY THE 50 YEAR FREQUENCY FLOOD. (WITHIN CORPORATE LIMITS )

SCALE 400 0 400 800 1200 FEET
APPROXIMATE

SOURCE : USDA AERIAL PHOTOGRAPHY SERIES CWN-1JJ (AUGUST 1968), AND INFORMATION FROM FIELD TECHNICIANS.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

# LISBON FLOOD HAZARD AREA

RANSOM COUNTY, NORTH DAKOTA

APRIL 1974 SHEET 3 OF 6 PLATE 7

5,0-32,956.17

USDA-SCS-LINCOLN, NEBR. 1974

R 56 W

SCALE 400 0 400 800 1200 FEET
APPROXIMATE

CORPORATE LIMIT

SECTION LINE

BURLINGTON NORTHERN R.R.

LEGEND

- 500-YEAR FREQUENCY FLOOD
- 100-YEAR FREQUENCY FLOOD
- 50-YEAR FREQUENCY FLOOD
- STREAM CHANNEL
- SEC. B-B — VALLEY CROSS SECTION
- ESTIMATED 100-YEAR FLOOD ELEVATION

NOTE:
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND.

T 134 N

1091.0

LISBON DAM

HEYENNE

CITY OF LISBON

CORPORATE LIMIT

SECTION LINE ROAD

1090

STATE HIGHWAY 32

500-YEAR FREQUENCY FLOOD
100-YEAR FREQUENCY FLOOD
50-YEAR FREQUENCY FLOOD

2 1
T. 12

SECTION B-B

SECTION LINE ROAD
STATE HIGHWAY 27

SOURCE: USDA AERIAL PHOTOGRAPHY SERIES CWN-1JJ (AUGUST 1968), AND INFORMATION FROM FIELD TECHNICIANS.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

# LISBON FLOOD HAZARD AREA

RANSOM, COUNTY, NORTH DAKOTA

APRIL 1974 SHEET 4 OF 6 PLATE B

USDA-SCS-LINCOLN NEBR. 1974

5,0-32,956.18

R 56 W

T 134 N

LEGEND

500-YEAR FREQUENCY FLOOD

100-YEAR FREQUENCY FLOOD

50-YEAR FREQUENCY FLOOD

STREAM CHANNEL

SEC. A-A VALLEY CROSS SECTION

ESTIMATED 100-YEAR FLOOD ELEVATION

NOTE :
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND.

500-YEAR FREQUENCY FLOOD

100-YEAR FREQUENCY FLOOD

50-YEAR FREQUENCY FLOOD

SECTION B-B

SECTION LINE

SECTION A

SECTION LINE ROAD
STATE HIGHWAY 27

CITY OF LISBON

CORPORATE LIMIT

FOREST STREET

STATE HIGHWAY 32

BURLINGTON NORTHERN R

RIVER

1089.0

N

SCALE 400 0 400 800 1200 FEET
APPROXIMATE

SOURCE : USDA AERIAL PHOTOGRAPHY SERIES CWN-1JJ (AUGUST 1968), AND INFORMATION FROM FIELD TECHNICIANS.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

# LISBON FLOOD HAZARD AREA

RANSOM COUNTY, NORTH DAKOTA

APRIL 1974 SHEET 5 OF 6 PLATE 9

USDA-SCS-LINCOLN, NEBR. 1974

5,0-32,956.19

R 56 W

T 134 N

CITY OF LISBON

BURLINGTON NORTHERN R.R.

STATE HIGHWAY 32

SHEYENNE RIVER

SECTION LINE

1089.5

1088.8

11 12 14 13

CORPORATE LIMIT

500-YEAR FREQUENCY FLOOD
100-YEAR FREQUENCY FLOOD
50-YEAR FREQUENCY FLOOD

CORPORATE LIMIT

SECTION LINE

N

LEGEND

- 500-YEAR FREQUENCY FLOOD
- 100-YEAR FREQUENCY FLOOD
- 50-YEAR FREQUENCY FLOOD
- STREAM CHANNEL
- ESTIMATED 100-YEAR FLOOD ELEVATION

NOTE : LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND.

SCALE 400 0 400 800 1200 FEET

APPROXIMATE

SOURCE : USDA AERIAL PHOTOGRAPHY SERIES CWN-1JJ (AUGUST 1968), AND INFORMATION FROM FIELD TECHNICIANS.

USDA-SCS-LINCOLN, NEBR. 1974

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

# LISBON FLOOD HAZARD AREA

RANSOM COUNTY, NORTH DAKOTA

APRIL 1974 SHEET 6 OF 6 PLATE 10

5,0-32,956.20

SOIL CONSERVATION SERVICE